Service Manual

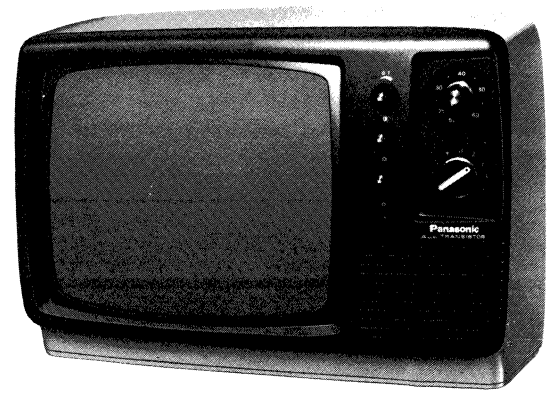
Black and White Television

TR-602

Chassis

No. 12B01-E

Main Manual



Specifications

Power Source:	AC: 220V 50Hz DC: 12V
Power Consumption:	AC: 33W DC: 16W
Antenna:	UHF/VHF Monopole Antenna 75 Ohm Unbalanced Type UHF and VHF External Antenna 75 Ohm Balanced Type
Receiving Channel:	VHF CH. 2 – 12 UHF CH. 21 – 69 C.C.I.R Standard
Intermediate Frequency:	VIDEO I-F 38.9MHz SOUND I-F 33.4MHz
Picture Tube:	12" 32cm (310JHB4) 90° Deflection Aluminized
Heater Voltage:	12V
Heater Current:	67mA
High Voltage:	13.2KV at zero beam
Transistors:	10
Diodes:	15
IC:	5
Speaker:	8.5cm Round Type
Audio Output:	Max. 0.9W
Automatic Control Circuits:	Keyed AGC (Automatic Gain Control) Saw-Tooth AFC (Automatic Frequency Control) AVR (Automatic Voltage Regulator)
Dimensions:	Height: 29cm Width: 42cm Depth: 31cm
Weight:	7.0kg
Car Battery Cord:	TY-170E (Optional) TY-172E (Optional)

Technische Daten

Stromversorgung:	Netz: 220V 50Hz Batterie: 12V
Stromverbrauch:	Netz: 33W, Batterie: 16W
Antenne:	UHF/VHF Monopole Antenne 75 Ohm Asymmetrisch UHF/VHF Aussenantenne 75 Ohm Symmetrisch
Empfangskanäle:	VHF Kanäle 2 – 12 UHF Kanäle 21 – 69 Nach C.C.I.R – Norm
Zwischenfrequenzen:	Video-ZF 38.9MHz TON-ZF 33.4MHz
Bildröhre:	32cm (310JHB4) 90° Ablenkung
Heizspannung:	12V
Heizstrom:	67mA
Hochspanung:	13.2KV unbelastet
Transistoren:	10
Dioden:	15
ICs:	5
Lautsprecher:	8.5cm, rund
NF-Ausgangsleistung:	0.9W max.
Automatische Regelschaltungen Schaltungen:	Unverzögerte Schwundregelung Automatische Kippfrequenzregelung Automatische Spannungskonstanthal tung
Abmessungen:	Höhe: 29cm Breite: 42cm Tiefe: 31cm
Gewicht:	7.0kg
Auto-Batterie Anpassung:	TY-170E (Als Sonderzubenor) TY-172E (Als Sonderzubenor)

National Panasonic®

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

CODE NO. IT D7903-364F

CAUTION

The high voltage supply at the picture tube anode will give an unpleasant shock, but does not supply enough current to give a fatal burn or shock.

However, secondary human reaction to otherwise harmless shocks have been known to cause injury. Always discharge the picture tube anode to the receiver chassis before handling the tube.

Certain portions of the high voltage generating circuit are dangerous and extreme caution should be observed. The picture tube is highly evacuated and, if broken, glass fragments will be violently expelled.

WHEN HANDLING THE PICTURE TUBE, ALWAYS WEAR GOGGLES AND PROTECTIVE CLOTHING.

VORSICHT

Die Hochspannung der Bildröhrenanode genügt für einen unangenehmen Schlag, ist aber nicht hoch genug um Verbrennungen oder tödliche Schläge zu bewirken.

Sekundäre Verletzungen als Folge harmloser Schläge sind jedoch vorgekommen. Vor Hantieren an der Bildröhre sollte daher die Anode längere Zeit über einen Widerstand von 100K Ohm zum Chassis entladen werden.

Gewisse Abschnitte des Hochspannungskreises sind gefährlich; äusserste Vorsicht ist angebracht. Die Bildröhre steht unter Hochvakuum: beim Zerbrechen werden Glasssstücke gefährlich umherfliegen.

BEIM HANTIEREN DER BILDRÖHRE IMMER SCHUTZBRILLE UND HANDSCHUHE TRAGEN!

ADJUSTMENTS — ABSTIMMUNGEN

VERTICAL HEIGHT AND VERTICAL LINEARITY

(1) These controls VR32 and VR33 should be adjusted simultaneously to give proper vertical size consistent with good vertical linearity.

Adjustment should be made to extend the picture limits approximately 3/6" (5mm) beyond the top and bottom edges of the mask.

BILDHÖHE UND LINEARITÄT

(1) Die Regler VR32 und VR33 müssen gleichzeitig justiert werden, um richtige Übereinstimmung zwischen der Bildhöhe und der Linearität zu erreichen.

Die justierung ist so vorzunehmen dass die Bildbegrenzung ca 5mm vom oberen und unteren Ende der Maske bleibt.

TO ADJUST THE AGC PROPERLY

(1) Set the channel selector to a station transmitting a strong signal.
(2) Turn the R-F AGC control VR19 clockwise or counter-clockwise to the point where the snow noise disappears in the picture.
(3) Check the reception on all channels.

KORREKTE EINSTELLUNG DES AGC

(1) Kanalwähler auf einen starken Sender einstellen.
(2) TF AGC Regler VR19 so einstellen, dass ein klares und rauschfreies Bild entseht.
(3) Den Empfang auf allen Kanälen prüfen.

AVR (AUTOMATIC VOLTAGE REGULATOR)

Connect a Volt meter across B+ supply line and chassis. Next make certain B+ supply voltage in +11.5V by adjusting the AVR control (VR71).

AVR (AUTOMATISCHE SPANNUNGSREGELUNG)

Einen Voltmeter über B+ versorgung und Chassis anschiessen. Darauf achten dass B+ Versorgungsspannung +11.5V ist, indem man den AVR Regler justiert (VR71).

YOKE POSITION

The yoke is secured to the neck of the picture tube with a clamp and screw. To adjust the yoke and correct for picture tilt, loosen this clamp. Correct tilt and retighten the screw.

POSITION DER ABLENKEINHEIT

Die Ablenkeinheit ist mittels einer Schelle und Schraube am Hals der Bild Röhre befestigt. Um die Ablenkeinheit einzustellen und eine Korrektur der Bildlage vorzunehmen, ist die Schelle zu lösen und nach vorgenommener Korrektur mit Hilfe der Schraube wieder zu Befestigen.

CENTERING

The picture centering device consists of two rings located at the rear of the yoke assembly. Each ring has a tab for ease of adjustment. The tabs should be rotated and moved towards or away from each other until the picture is properly centered on the screen of the picture tube.

ZENTRIEREN

Die Bildzentrierungseinheit besteht aus zwei Ringen die sich am Ende der Ablenkeinheit befinden.
Jeder Ring hat einen Streifen um die Einstellung zu Vereinfachen. Die Streifen sind zu oder von einander zu bewegen bis das Bild sich genau in der Mitte der Bildröhre befindet.

HORIZONTAL WIDTH

Adjust the slug of coil (L403) to externd the picture about 13mm beyond the mask with the brightness control set to normal operating position.

ZEILENBREITE

Den Spulenkern so justieren dass das Bild bis zu 13mm über die Maske hinaus ragt, der Helligkeitsregler sollte dabei in Normal Position sein.

-DISASSEMBLY INSTRUCTION——DEMONTAGE ANLEITUNG—

REAR COVER REMOVAL

1. Remove 5 screws Ⓐ as in fig. 1.
2. Pick up the rear cover in fig. 1.

POWER BLOCK REMOVAL

1. Remove 1 screw Ⓑ in fig. 2.

TUNER BLOCK REMOVAL

1. Pull off the ON-OFF/VOLUME knob, the control knobs, the fine tuning knobs and the channel selector knobs.
2. Remove 3 screws Ⓒ in fig. 3.

SPEAKER REMOVAL

1. Remove the power block.
2. Remove 2 screws Ⓓ in fig. 3.

ABNEHMEN DER RUCKWAND

1. 5 Schrauben Ⓐ wie in Abb. 1 entfernen.
2. Rückwand wie in Abb. 1 herausnehmen.

AUSBAU DER VERSORGUNGSEINHEIT

1. 1Schrauben Ⓑ wie in Abb. 2.

AUSBAU DER TUNER EINHEIT

1. ON-OFF Lautstärkeregler Knopf, den Bedienungsknopf, Feinahstimmungsknöpfe sowie die Kanalwahlknopfe entfernen.
2. 3 Schrauben Ⓒ entfernen wie in Abb. 3.

AUSBAU DES LAUTSPRECHERS

1. Die Versorgungseinheit entfernen.
2. 2 Schrauben Ⓓ entfernen wie in Abb. 3.

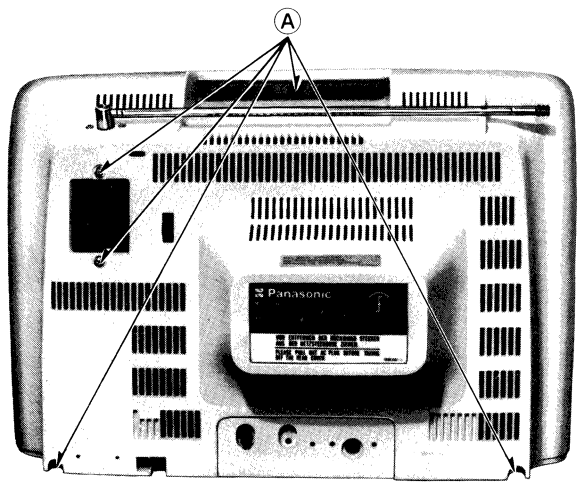


Fig. 1 Abb. 1

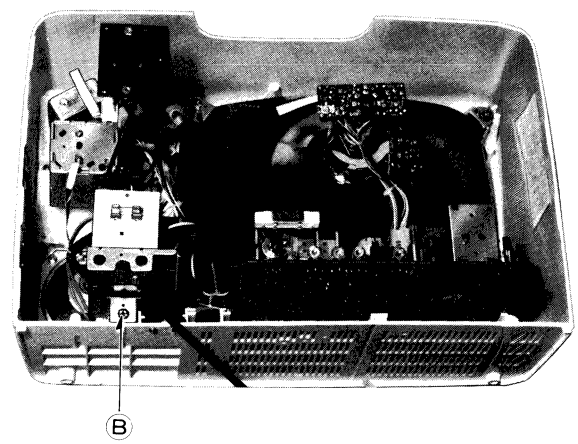


Fig. 2 Abb. 2

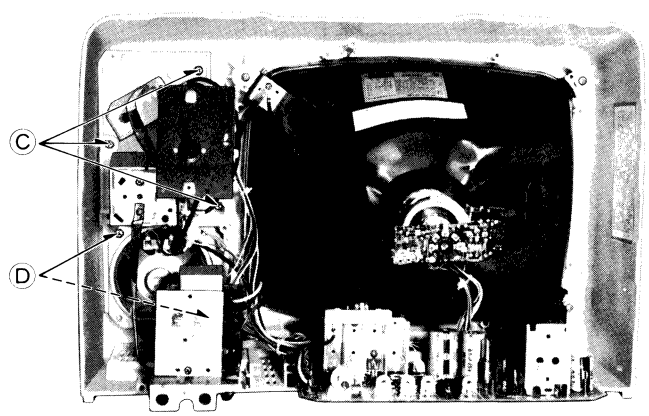


Fig. 3 Abb. 3

VIDEO I-F ALIGNMENT — BILD-ZF ADSTIMMUNG

EQUIPMENT CONNECTION

Disconnect the jumper lead (J401, J402).

Power Supply

Supply DC +11.5V to TP91.

Oscilloscope, Sweep Generator. Marker Generator.

Connect as shown in Fig. 4.

VERBINDUNGSPLAN DER AUSRÜSTUNG

Brücke (J401, J402). entfernen.

Netzzufuhr

Zufuhr 11.5V DC an TP91

Oszilloskop, Wobbel Generator. Marken Generator.

Verbindung wie in Abb. 4.

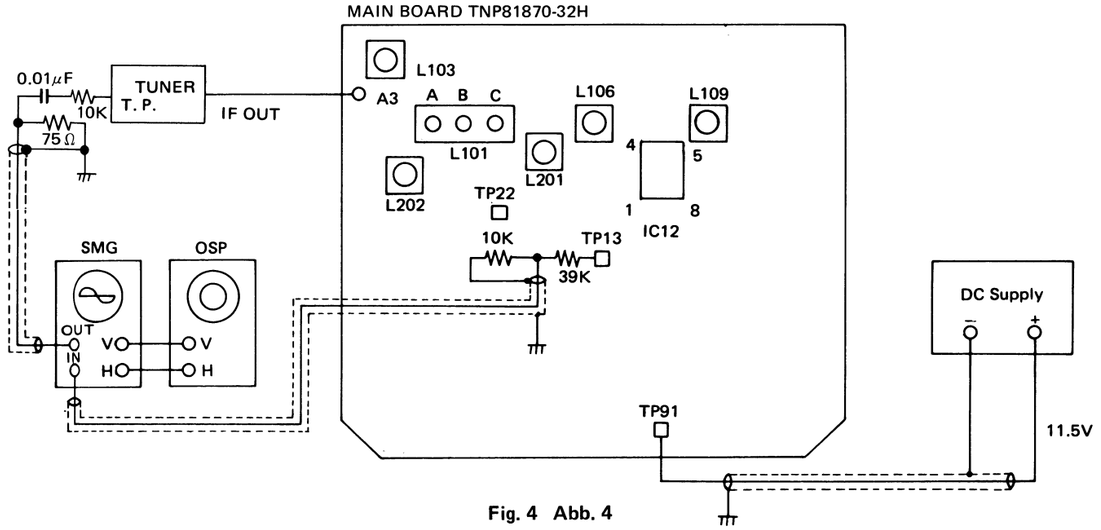


Fig. 4 Abb. 4

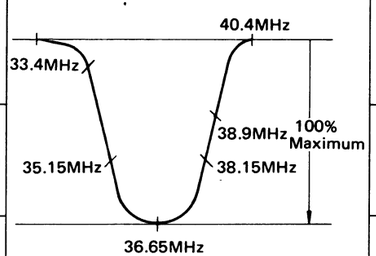
STEP	ALIGNMENT	WAVEFORM KURVENFORM	Schritt	ABGLEICHEN
1	Adjust L103 to the minimum gain at 40.4MHz marker position as in Fig. 5.		1	L103 auf Maximum bie 40.4MHz Markeirung wie in Abb. 5.
2	Adjust L109 to the maximum gain at 38.9MHz marker position as in Fig. 5.		2	L109 auf Maximum bei 38.9MHz Markeirung wie in Abb. 5.
3	Adjust L106 and L108 to the maximum gain at 36.65MHz marker position as in Fig. 5.		3	L106 und L108 auf Maximum bei 36.65MHz Markeirung wie in Abb. 5.

Fig. 5 Abb. 5

SOUND I-F ALIGNMENT — TON-ZF ABSTIMMUNG

EQUIPMENT CONNECTION

Disconnect the jumper lead (J401, J402).

Power Supply

Supply DC +11.5V to TP91

Oscilloscope, Sweep Generator. Marker Generator.

Connect shown in Fig. 6.

VERBINDUNGSPLAN DER AUSRÜSTUNG

Brücke (J401, J402) entfernen.

Netzzufuhr

Zufuhr +11.5V DC an TP91

Oszilloskop, Wobbel Generator. Marken Generator.

Verbindung wie in Abb. 5.

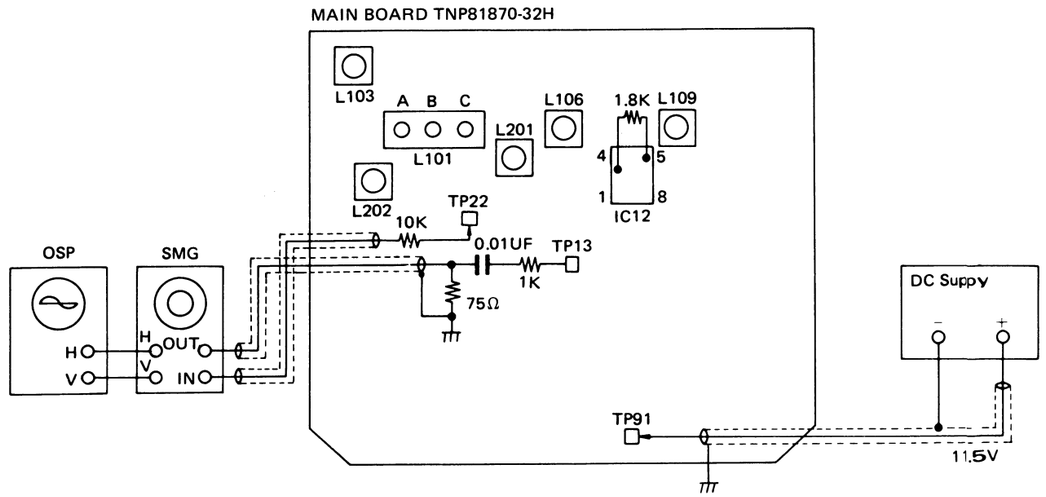


Fig. 6 Abb. 6

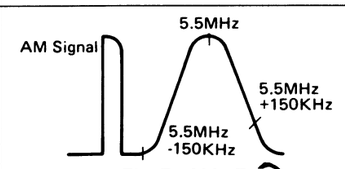
STEP	ALIGNMENT	WAVEFORM KURVENFORM	Schritt	ABGLEICHEN
1	Adjust both L201 and L202 to the maximum gain at 5.5MHz AM signal as in Fig. 7.		1	L201 und L202 Beide auf Maximum bei 5.5MHz amplituden modulation singla wie in Abb. 7.
2	Adjust L202 to reduce the difference of AM signal as in Fig. 8.		2	L202 so einstellen, daß die Differenz zwischen amplituden modulation signal in Abb. 8.
3	Adjust L202 until the 5.5MHz marker is at the center of slanted line as in Fig. 8.		3	L202 so einstellen bis 5.5MHz Markierung in der Mitte der S Kurve ist wie in Abb. 8.

Fig. 7 Abb. 7

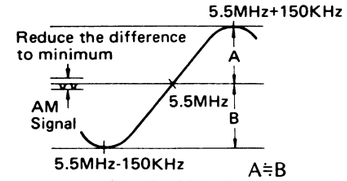
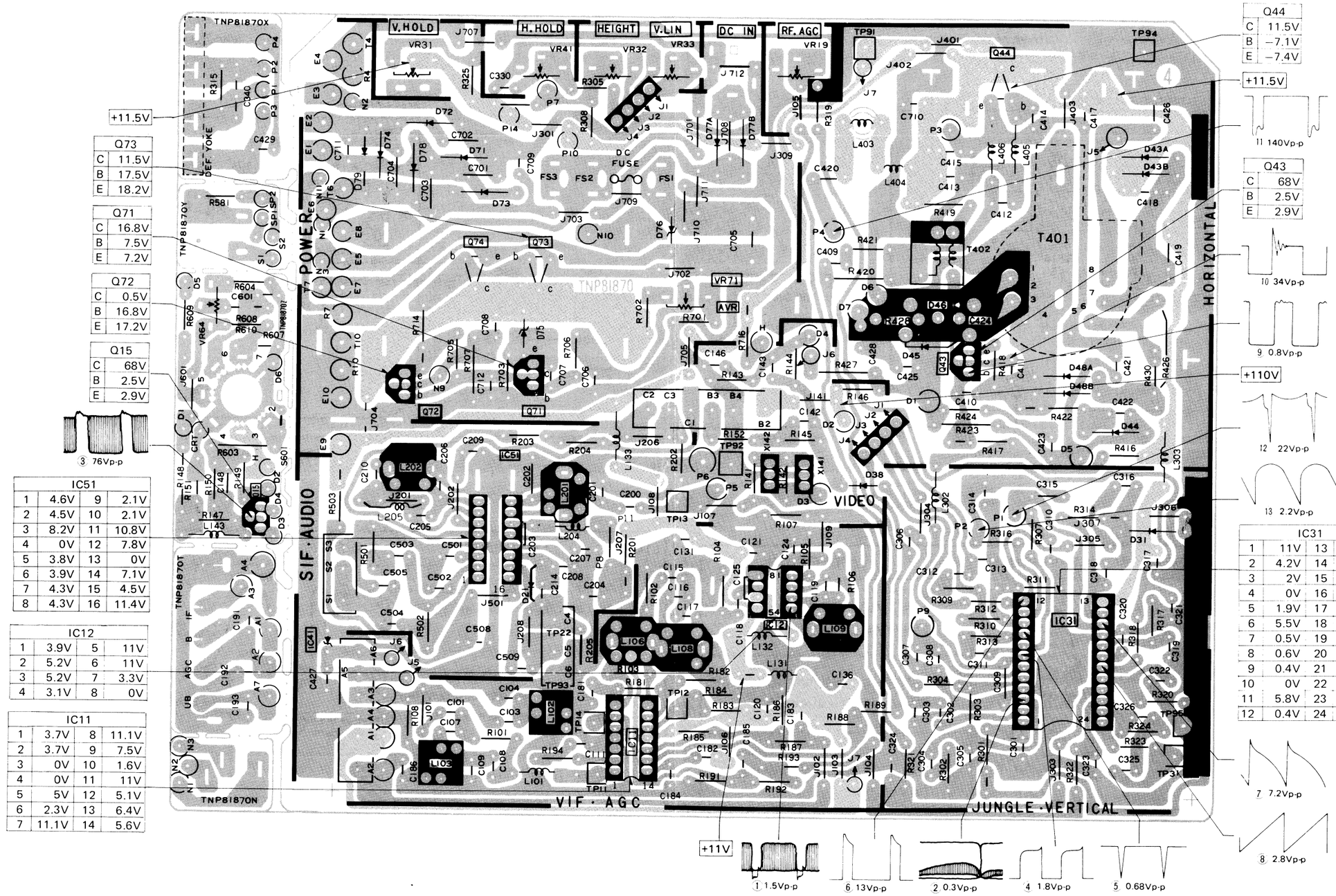


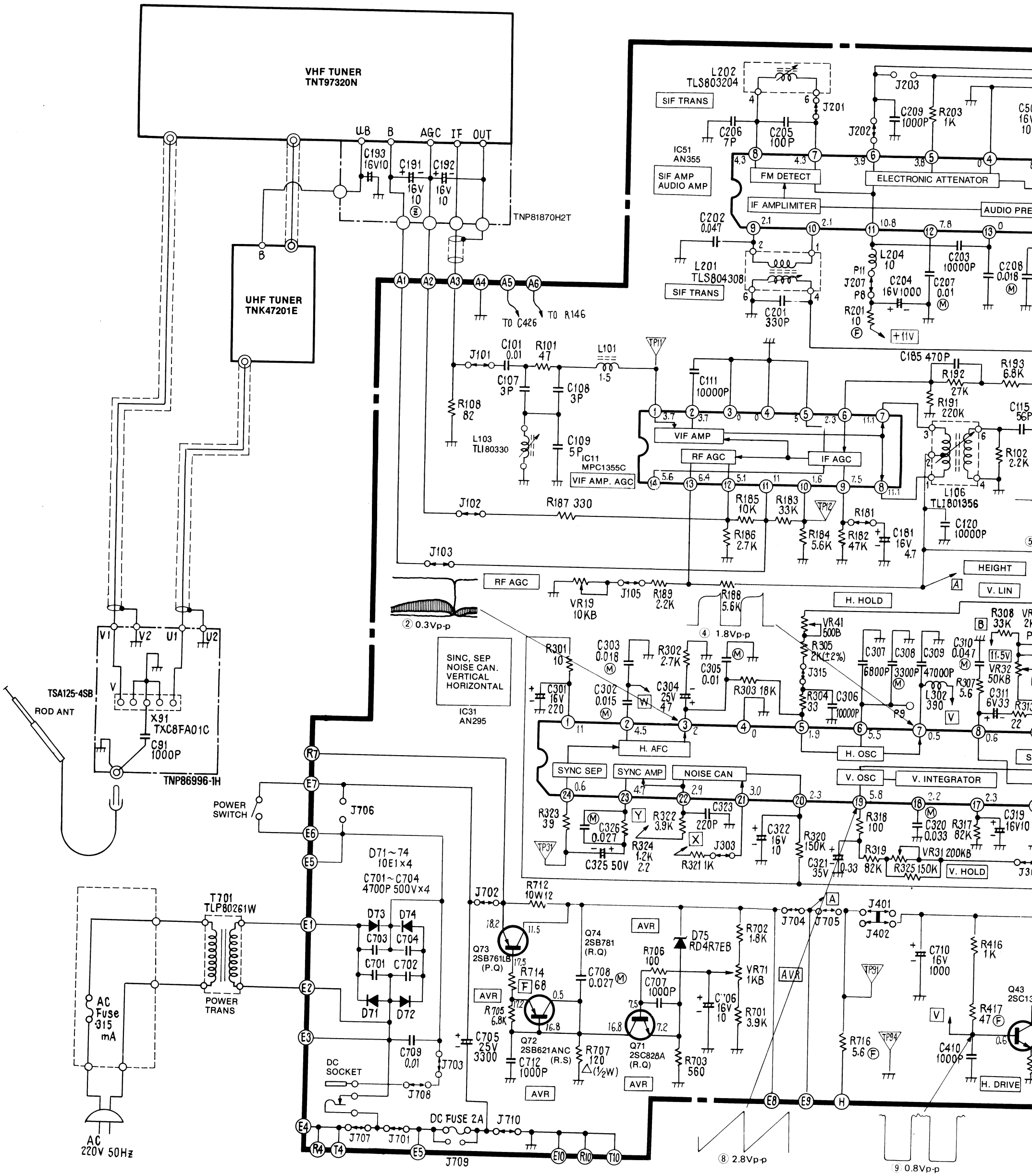
Fig. 8 Abb. 8

CONDUCTOR VIEWS

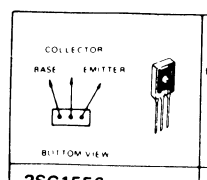
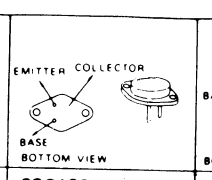
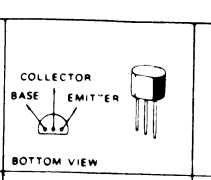
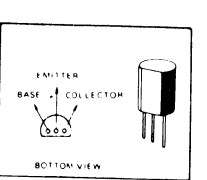
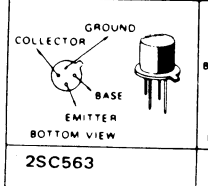
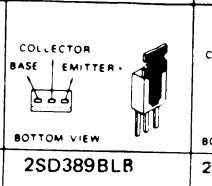
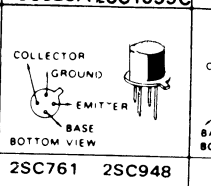
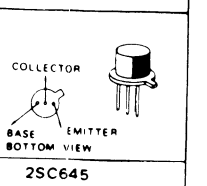
TNP81870-32H **TNP81870H1Z**
TNP81870H1X **TNP81870H2T**
TNP81870H1Y



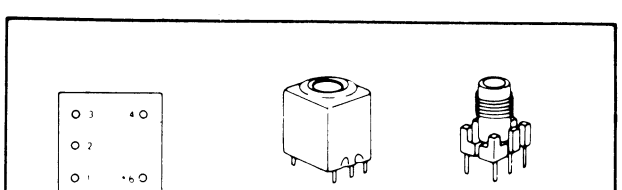
SCHEMATIC DIAGRAM FOR MODEL TR-6



TRANSISTOR BASE INFORMATION

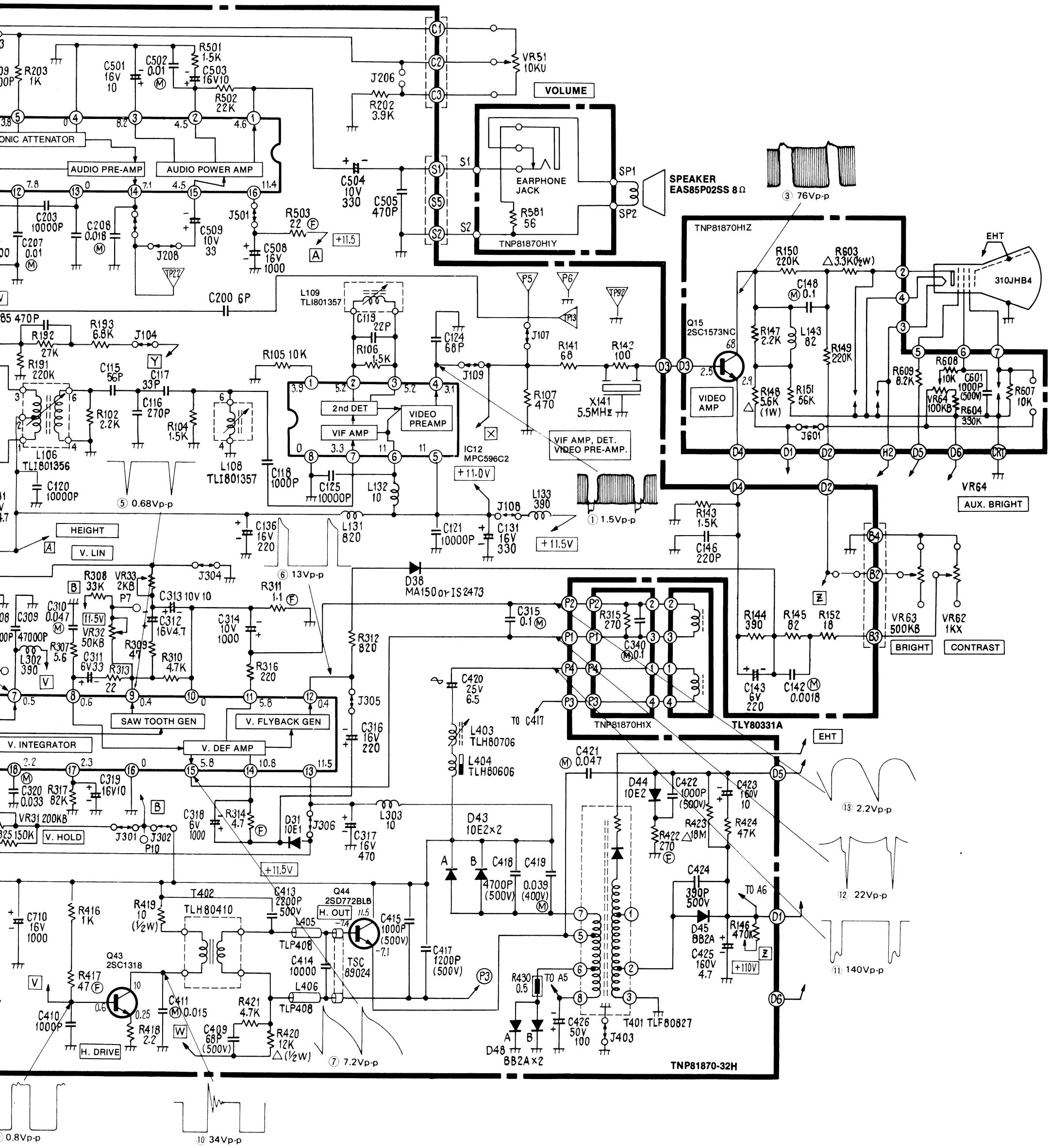
			
2SC1556	2SC1025MT	2SA564A 2SC1317 2SA719 2SC828 2SC1318 2SC829C 2SC828A 2SC1359C	2SC1686 2SC1687
			
2SC563	2SD389BLB	2SC761 2SC948	2SC645

TRANSFORMER TERMINAL INFORMATION

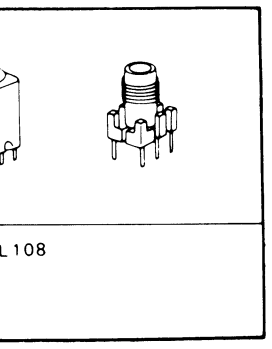


L101 L104 L106 L107 L108
L201 L202

DEL TR-602S (CHASSIS NO. 12B01-E)



MINAL



NOTE

1 RESISTOR
All resistors are carbon 1/4W resistor, unless otherwise noted the following marks
Unit of resistance is OHM (Ω) (K=1,000, M=1,000,000)
△ : Solid resistor
● : Metal oxide resistor
□ : Wire wound resistor
Thermistor
Fuse resistor

2 CAPACITOR
All capacitors are ceramic 50V capacitor, unless otherwise noted the following marks
Unit of capacitance is μF, unless otherwise noted
M Polyester capacitor
S Polystylene capacitor
Electrolytic capacitor

3 COIL
Unit of inductance is μH

4 TEST POINT
Test point position

5 VOLTAGE MEASUREMENT
Voltage is measured by a volt ohm meter with DC 20K OHM/V receiving normal signal, when all controls are set to the maximum position

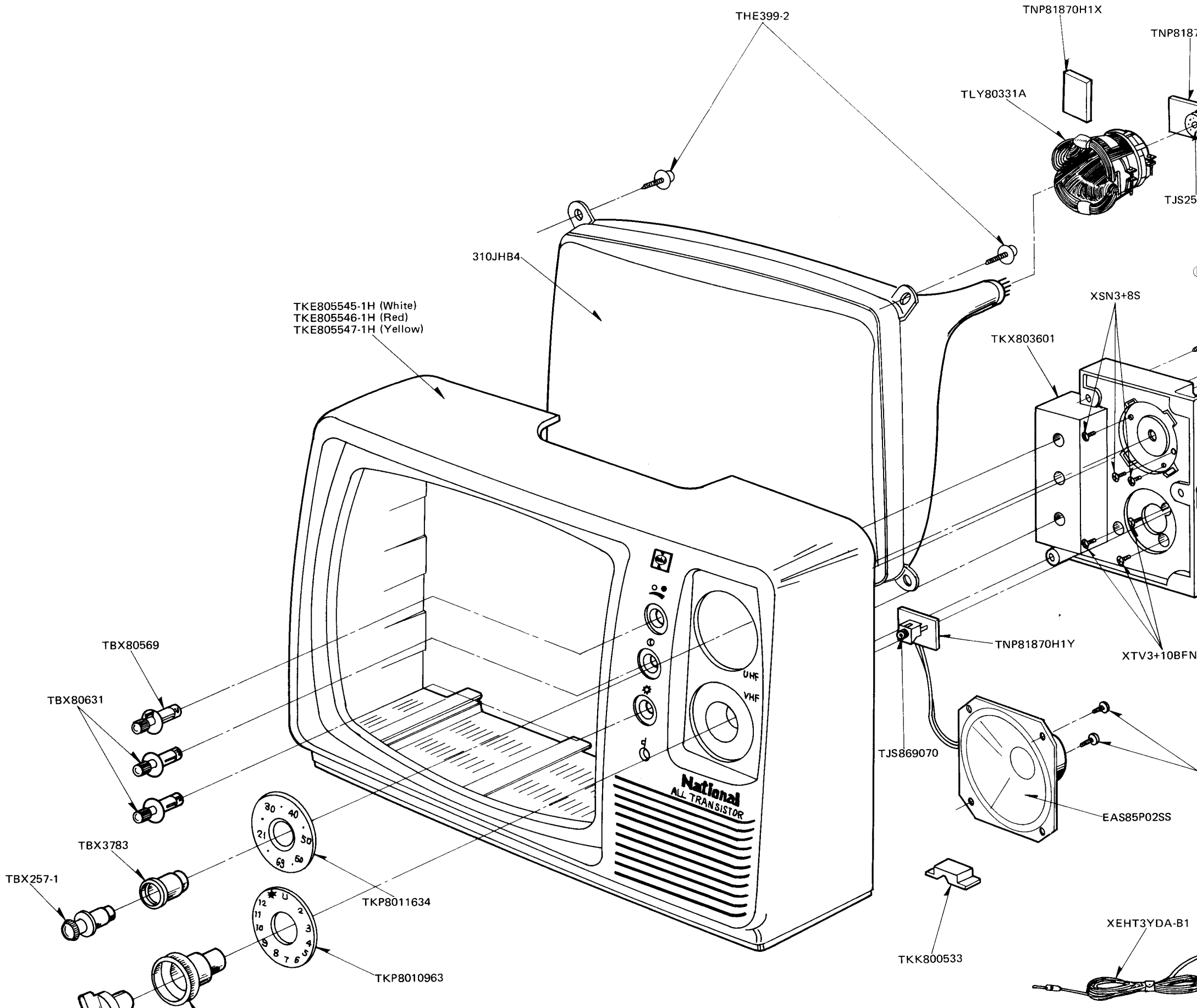
6 Number in red circle indicates waveform number

7 When arrow mark (↗) is found, connection is easily found along with the direction of an arrow

8 When schematic diagram of a board is described in more than two places, they are encircled with dotted line (– —)

9 This schematic diagram is the latest at the time of printing and subject to change without notice

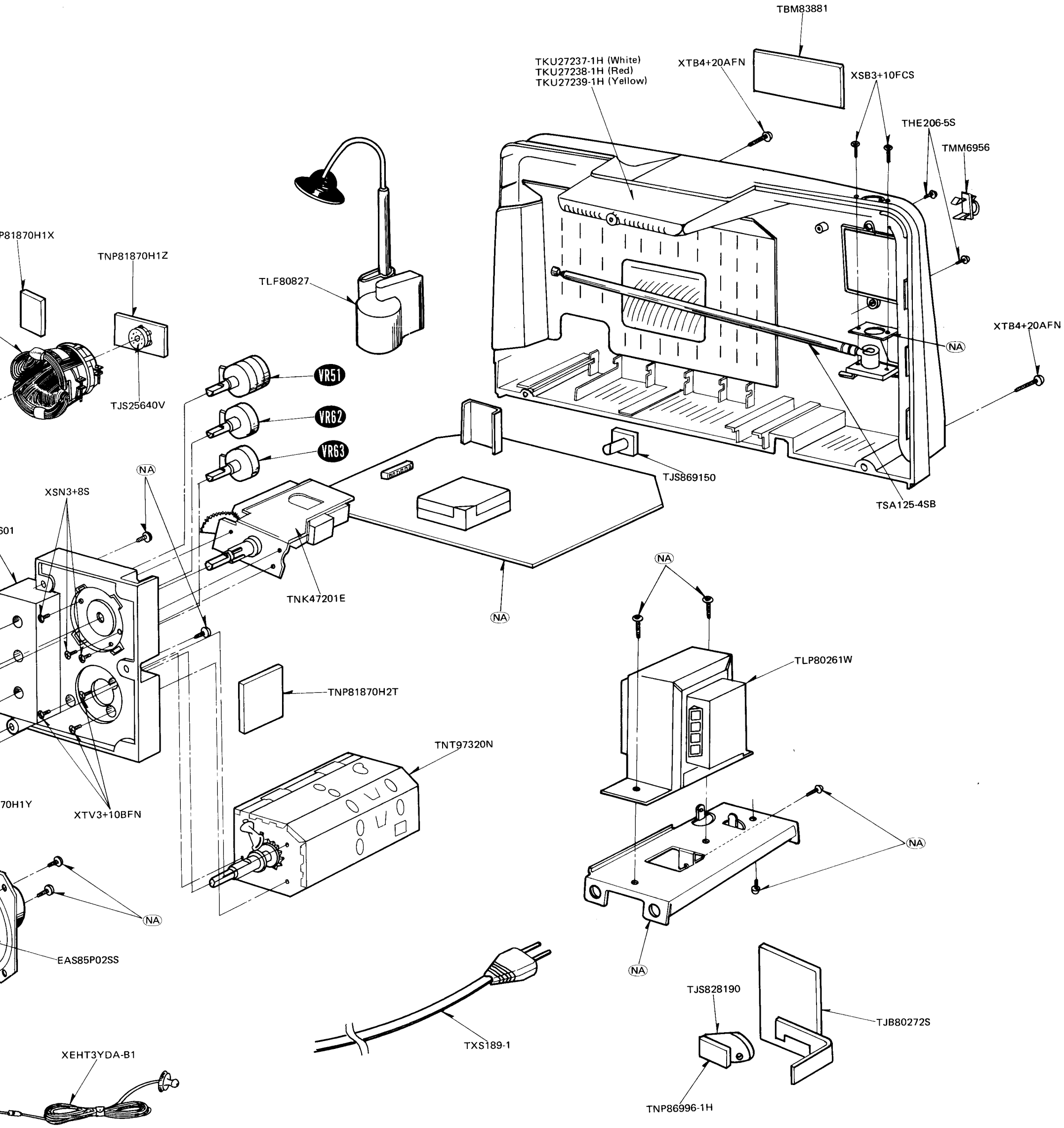
EXPLODED V



Note: Parts or Components marked with (NA) and unlisted are not available as a replacement part.

Bemerkung: Mit (NA) gekennzeichnete Teile order bauelemente und Teile die nicht in der Ersatzteilliste aufgeführt sind, sind nicht als Ersatzteile erhältlich.

—EXPLODED VIEW—



REPLACEMENT PARTS LIST — ERSATZEILLSTE

Note: TNP81870-32H (Main Board) is not availabel as a complete printed circuit board.

Bemerkung: TNP81870-32H die gedruckte schaltung ist als komplet bestückte einheit lieferbar.

Ref. No.	Part No.	Description
		CABINET AND MAIN CHASSIS PARTS
	TKE805545-1H	Escutcheon Complete (White)
	TKE805546-1H	Escutcheon Complete (Red)
	TKE805547-1H	Escutcheon Complete (Yellow)
	TKP8010963	VHF Indicator Plate
	TKP8011634	UHF Indicator Plate
	TKU827237-1H	Rear Cover Complete (White)
	TKU827238-1H	Rear Cover Complete (Red)
	TKU827239-1H	Rear Cover Complete (Yellow)
	TKK800533	Cord Holder
	TKX803601	Tuner Bracket
	TBM83881	Model Plate
	TBX80760	VHF Channel Knob
	TBX80758	VHF Fine Tuning Knob
	TBX257-1	UHF Channel Knob
	TBX3783	UHF Fine Tuning Knob
	TBX80569	ON-OFF Volume Knob
	TBX80631	Bright. & Contrast Knob
	TMM6956	Cord Hook
	310JHB	Picture Tube
	TLP80261W	Power Transformer
	TLY80331A	Deflection Yoke
	TNT97320N	VHF Tuner
	TNK47201E	UHF Tuner
	EAS85P02SS	Speaker
	TSA125-4SB	Rod Antenna
	TSX189-1	Power Cord
	TJB80108-6SE	Fuse Holder
	TJB80272S	Antenna Terminal Board
	TJS828190	75Ω Connector
	TJT8506M	6-P Socket Housing
	TJT8707M	Socket Housing Terminal
VR51	EVVBLMF25U14	ON-OFF Volume Control 10KΩU
VR62	EVVB1AF2513X	Contrast Control 1KΩX
VR63	EVVB0AF25B55	Bright. Control 500KΩB
	XBA2C04TR0	Fuse
	TNP81870H2T	Tuner Circuit Board Complete
	TNP81870H1X	Deflection Yoke Circuit Board Complete
	TNP81870H1Y	Earphone Socket Circuit Board Complete
	TNP81870H1Z	Picture Tube Socket Circuit Board Complete
	TNP86996-1H	U/V Signal Separator Circuit Board Complete
	XTB4+20AFN	Rear Cover Mounting Screw
	THE206-5S	Rear Cover Mounting Screw (Antenna Board)
	XSB3+10FCS	Rod Antenna Mounting Screw
	THE399-2	Picture Tube Mounting Screw
	XSN3+8S	UHF Tuner Mounting Screw
	XTB3+10BFN	VHF Tuner Mounting Screw
	TPC812121	Outer Carton
	XAPD01602	Filler Complete
	TPE84002	Set Cover
	TQB811256	Fan Bag
	TQB810256H	Instruction Book
	XEHT3YDA-B1	Earphone
	TNP86996-1H	
C91	ECKD2H102PE	Ceramic 0.01μF +100%,–0% 500V
X91	TXC8FA01C	U/V Signal Separator
	TNP81870H2T	
C191	ECEA16Z10E	Electrolytic 10μF 16V
C192	ECEA1CS100	Electrolytic 10μF 16V
C193	ECEA1CS100	Electrolytic 10μF 16V
	TNP81870H1X	
C340	ECQM05104JZ	Polyester 0.1μF ± 5% 50V
R315	ERD25TJ271	Carbon 270Ω ± 5% 1/4W
	TNP81870H1Y	
R581	ERD25TJ560	Carbon 56Ω ± 5% 1/4W
	TJS869070	Earphone Socket
	TNP81870H1Z	
Q15	2SC1573NC	Transistor (Video Output)
L143	TLU820K106C	Peaking Coil
C148	ECQM05104JZ	Polyester 0.1μF ± 5% 50V
C601	ECKD2H102KB	Ceramic 1000pF ± 10% 500V
R147	ERD25TJ222	Carbon 2.2KΩ ± 5% 1/4W
R148	ERG1ANJ562	Metal Oxide 5.6KΩ ± 5% 1W
R149	ERD25TJ224	Carbon 220KΩ ± 5% 1/4W
R150	ERD25TJ224	Carbon 220KΩ ± 5% 1/4W
R151	ERD25TJ563	Carbon 56KΩ ± 5% 1/4W
R603	ERC12GJ332	Solid 3.3KΩ ± 5% 1/2W
R604	ERD25TJ334	Carbon 330KΩ ± 5% 1/4W
R607	ERD25TJ103	Carbon 10KΩ ± 5% 1/4W
R608	ERD25TJ103	Carbon 10KΩ ± 5% 1/4W
R609	ERD25TJ822	Carbon 8.2KΩ ± 5% 1/4W
VR64	EVTV0UA00B15	Sub Bright Control 100KΩB
	TJS25640V	Picture Tube Socket
	TNP81870-32H	
	I.C	
IC11	TVSMPC1355C	Video-IF
IC12	TVSMPC596C2	Video-Det.
IC31	AN295	Sync. Set. AMP. V/H OSC.
IC51	AN355	Audio
	TRANSISTORS	
Q43	2SC1318	Horiz. Drive
Q44	2SD772BLB	Horiz. Output
Q71	2SC828A	Switching Regulator
Q72	2SB621ANC	Switching Regulator
Q73	2SB761LB	Switching Regulator

Ref. No.	Part No.	Description
	DIODES	
D31	TVS10E1	Rectifier
D38	MA150	Blanking
D43A	TVS10E2	Damper
D43B	TVS10E2	Damper
D44	TVS10E2	Blanking
D45	TVSBB2A	Rectifier
D48A	TVSBB2A	Rectifier
D48B	TVSBB2A	Rectifier
D71	TVS10E1	Power Rectifier
D72	TVS10E1	Power Rectifier
D73	TVS10E1	Power Rectifier
D74	TVS10E1	Power Rectifier
D75	TVSRD4R7EB	Zenner
	COILS & TRANSFORMERS	
L101	TLU1R5M106C	Peaking Coil
L103	TLI80330	Sound Trap Coil
L106	TLI801356	Video IF Transformer
L108	TLI801357	Video IF Transformer
L109	TLI801357	Video IF Transformer
L132	TLU100K106C	Peaking Coil
L133	TLU391K106C	Peaking Coil
L201	TLS804308	Sound-IF Input Coil
L202	TLS803204	Sound Det. Transformer
L204	TLU100K106C	Peaking Coil
L302	TLU391K106C	Peaking Coil
L303	TLU100K106C	Peaking Coil
L403	TLH80706	Horiz. Width Coil
L404	TLH80606	Horiz. Lin. Coil
L405	TLP408	Choke Coil
L406	TLP408	Choke Coil
T401	TLF80827	Flyback Transformer
T402	TLH80410	Horiz. Drive Transformer
	CAPACITORS	
C101	ECKD1H103PF	Ceramic 0.01μF +100%,–0% 50V
C107	ECCD1H030CT	Ceramic 3pF ± 0.25pF 50V
C108	ECCD1H030CT	Ceramic 3pF ± 0.25pF 50V
C109	ECCD1H050CS	Ceramic 5pF ± 0.25pF 50V
C111	ECKD1H103PF	Ceramic 0.01μF +100%,–0% 50V
C115	ECCD1H560JS	Ceramic 56pF ± 5% 50V
C116	ECCD1H271JS	Ceramic 270pF ± 5% 50V
C117	ECCD1H330JS	Ceramic 33pF ± 5% 50V
C118	ECKD1H102KB	Ceramic 1000pF ± 10% 50V
C119	ECCD1H220J	Ceramic 22pF ± 5% 50V
C120	ECKD1H103PF	Ceramic 0.01μF +100%,–0% 50V
C121	ECKD1H103PF	Ceramic 0.01μF +100%,–0% 50V
C124	ECCD1H680J	Ceramic 68pF ± 5% 50V
C125	ECKD1H103PF	Ceramic 0.01μF +100%,–0% 50V
C131	ECEA1CS331	Electrolytic 330μF 16V
C136	ECEA1CS221	Electrolytic 220μF 16V
C142	ECQM05182JZ	Polyester 1800pF ± 5% 50V
C143	ECEA0JS221	Electrolytic 220μF 6V
C146	ECCD1H221J	Ceramic 220pF ± 5% 50V
C181	ECSZ16EF4R7N	Tantal 4.7μF 16V

Ref. No.	Part No.	Description
C185	ECKD1H471KB2	Ceramic 470pF ± 10% 50V
C200	ECCD1H060CC	Ceramic 6pF ± 0.25pF 50V
C201	ECQS1331JWT	Styrol 330pF ± 5% 100V
C202	ECKD1H473ZF	Ceramic 0.047μF +80%,–20% 50V
C203	ECKD1H103PF	Ceramic 0.01μF +100%,–0% 50V
C204	ECEA1CS102	Electrolytic 100μF 16V
C205	ECCD1H101JP	Ceramic 100pF ± 5% 50V
C206	ECCD1H070CC	Ceramic 7pF ± 0.25pF 50V
C207	ECQM05103JZ	Polyester 0.01μF ± 5% 50V
C208	ECQM05183JZ	Polyester 0.018μF ± 5% 50V
C209	ECKD1H102KB	Ceramic 1000pF ± 10% 50V
C301	ECEA1CS221	Electrolytic 220μF 16V
C302	ECQM05153JZ	Polyester 0.015μF ± 5% 50V
C303	ECQM05183JZ	Polyester 0.018μF ± 5% 50V
C304	ECEA1ES4R7	Electrolytic 4.7μF 25V
C305	ECQM05103JZ	Polyester 0.01μF ± 5% 50V
C306	ECKD1H103PF	Ceramic 0.01μF +100%,–0% 50V
C307	ECQS1682JWT	Styrol 6800pF ± 5% 100V
C308	ECQM05332JZ	Polyester 3300pF ± 5% 50V
C309	ECKD1H473ZF	Ceramic 0.047μF +80%,–20% 50V
C310	ECQM05473JZ	Polyester 0.047μF ± 5% 50V
C311	ECEA0JS330	Electrolytic 33μF 6.3V
C312	ECSZ16EF4R7N	Tantal 4.7μF 16V
C313	ECSZ10EF10Y	Tantal 10μF 10V
C314	ECEA1AS102	Electrolytic 1000μF 10V
C315	ECQM05104JZ	Styrol 0.1μF ± 5% 50V
C316	ECEA1CS221	Electrolytic 220μF 16V
C317	ECEA1CS471	Electrolytic 470μF 16V
C318	ECEA0JS102	Electrolytic 1000μF 6.3V
C319	ECEA16Z10E	Electrolytic 10μF 16V
C320	ECQM05333JZ	Polyester 0.033μF ± 5% 50V
C321	TCSZ35EFR33	Tantal 0.33μF 35V
C322	ECEA1CS100	Electrolytic 10μF 16V
C323	ECKD1H221J	Ceramic 220pF ± 5% 50V
C325	ECEA1HS2R2	Electrolytic 2.2μF 50V
C326	ECQM05273JZ	Polyester 0.027μF ± 5% 50V
C409	ECCD2H680K	Ceramic 68pF ± 10% 500V
C410	ECKD1H102KB	Ceramic 1000pF ± 10% 50V
C411	ECQM05153JZ	Polyester 0.015μF ± 5% 50V
C413	ECKD2H222KB2	Ceramic 2200pF ± 10% 500V
C414	ECKD1H103PF2	Ceramic 0.01μF +100%,–0% 50V
C415	ECKD2H102KB2	Ceramic 1000pF ± 10% 500V
C417	ECKD2H122KB2	Ceramic 1200pF ± 10% 500V
C418	ECKD2H472KB	Ceramic 4700pF ± 10% 500V
C419	ECQM4393KZ	Polyester 0.039μF ± 10% 500V
C420	ECEA25W6R5Z	Electrolytic 6.5μF 25V
C421	ECQM05473JZ	Polyester 0.047μF ± 5% 50V
C422	ECKD2H102KB	Ceramic 1000pF ± 10% 500V
C423	ECEA160V10Z	Electrolytic 10μF 160V
C424	ECKD2H391KB9	Ceramic 390pF ± 10% 500V
C425	ECEA160V4R7	Electrolytic 4.7μF 160V
C426	ECEA50V100Y	Electrolytic 100μF 50V
C501	ECEA1CS100	Electrolytic 100μF 16V
C502	ECQM05103JZ	Polyester 0.01μF ± 5% 50V

Ref. No.	Part No.	Description
C503	ECEA1CS100	Electrolytic 10μF 16V
C504	ECEA1AS331	Electrolytic 330μF 10V
C505	ECKD1H471KB2	Ceramic 470pF ± 10% 50V
C508	ECEA1CS102	Electrolytic 1000μF 16V
C509	ECEA1AS330	Electrolytic 33μF 10V
C701	ECKD2H472PE	Ceramic 4700pF +100%,–0% 500V
C702	ECKD2H472PE	Ceramic 4700pF +100%,–0% 500V
C703	ECKD2H472PE	Ceramic 4700pF +100%,–0% 500V
C704	ECKD2H472PE	Ceramic 4700pF +100%,–0% 500V
C705	ECET25R3300W	Electrolytic 3300μF 25V
C706	ECEA1CS100	Electrolytic 10μF 16V
C707	ECKD1H102KB	Ceramic 1000pF ± 10% 50V
C708	ECQM05273JZ	Polyester 0.027μF ± 5% 50V
C709	ECKD1H103PF	Ceramic 0.01μF +100%,–0% 50V
C710	ECEA1CS102	Electrolytic 1000μF 16V
RESISTORS		
R101	ERD25TJ470	Carbon 47Ω ± 5% 1/4W
R102	ERD25TJ222	Carbon 2.2KΩ ± 5% 1/4W
R104	ERD25TJ152	Carbon 1.5KΩ ± 5% 1/4W
R105	ERD25TJ103	Carbon 10KΩ ± 5% 1/4W
R106	ERD25TJ152	Carbon 1.5KΩ ± 5% 1/4W
R107	ERD25TJ471	Carbon 470Ω ± 5% 1/4W
R108	ERD25TJ820	Carbon 82Ω ± 5% 1/4W
R141	ERD25TJ680	Carbon 68Ω ± 5% 1/4W
R142	ERD25TJ101	Carbon 100Ω ± 5% 1/4W
R143	ERD25TJ152	Carbon 1.5KΩ ± 5% 1/4W
R144	ERD25TJ391	Carbon 390Ω ± 5% 1/4W
R145	ERD25TJ820	Carbon 82Ω ± 5% 1/4W
R146	ERD25TJ474	Carbon 470KΩ ± 5% 1/4W
R152	ERD25TJ180	Carbon 18Ω ± 5% 1/4W
R182	ERD25TJ473	Carbon 47KΩ ± 5% 1/4W
R183	ERD25TJ333	Carbon 33KΩ ± 5% 1/4W
R184	ERD25TJ562	Carbon 5.6KΩ ± 5% 1/4W
R185	ERD25TJ103	Carbon 10KΩ ± 5% 1/4W
R186	ERD25TJ272	Carbon 2.7KΩ ± 5% 1/4W
R187	ERD25TJ331	Carbon 330Ω ± 5% 1/4W
R188	ERD25TJ562	Carbon 5.6KΩ ± 5% 1/4W
R189	ERD25TJ222	Carbon 2.2KΩ ± 5% 1/4W
R191	ERD25TJ224	Carbon 220KΩ ± 5% 1/4W
R192	ERD25TJ273	Carbon 27KΩ ± 5% 1/4W
R193	ERD25TJ682	Carbon 6.8KΩ ± 5% 1/4W
R201	ERD25FJ100	Carbon 10Ω ± 5% 1/4W
R202	ERD25TJ392	Carbon 3.9KΩ ± 5% 1/4W
R203	ERD25TJ102	Carbon 1KΩ ± 5% 1/4W
R301	ERD25TJ100	Carbon 10Ω ± 5% 1/4W
R302	ERD25TJ272	Carbon 2.7KΩ ± 5% 1/4W
R303	ERD25TJ183	Carbon 18KΩ ± 5% 1/4W
R304	ERD25TJ330	Carbon 33Ω ± 5% 1/4W
R305	ERD25TG2001	Carbon 2KΩ ± 5% 1/4W
R307	ERD25TJ5R6	Carbon 5.6Ω ± 5% 1/4W
R308	ERD25TJ333	Carbon 33KΩ ± 5% 1/4W
R309	ERD25TJ470	Carbon 47Ω ± 5% 1/4W
R310	ERD25TJ472	Carbon 4.7KΩ ± 5% 1/4W
R311	ERD14FJ1R1	Carbon 1.1Ω ± 5% 1/4W

Ref. No.	Part No.	Description
R312	ERD25TJ821	Carbon 820Ω ± 5% 1/4W
R314	ERD25FJ4R7	Carbon 4.7Ω ± 5% 1/4W
R316	ERD25TJ221	Carbon 220Ω ± 5% 1/4W
R317	ERD25TJ823	Carbon 82KΩ ± 5% 1/4W
R318	ERD25TJ101	Carbon 100Ω ± 5% 1/4W
R319	ERD25TJ823	Carbon 82KΩ ± 5% 1/4W
R320	ERD25TJ154	Carbon 150KΩ ± 5% 1/4W
R321	ERD25TJ102	Carbon 1KΩ ± 5% 1/4W
R322	ERD25TJ392	Carbon 3.9KΩ ± 5% 1/4W
R323	ERD25TJ390	Carbon 39Ω ± 5% 1/4W
R324	ERD25TJ122	Carbon 1.2KΩ ± 5% 1/4W
R325	ERD25TJ154	Carbon 150KΩ ± 5% 1/4W
R416	ERD25TJ102	Carbon 1KΩ ± 5% 1/4W
R417	ERD25FJ470	Carbon 47Ω ± 5% 1/4W
R418	ERD25TJ2R2	Carbon 2.2Ω ± 5% 1/4W
R419	ERQ12HJ100	Fuseble 10KΩ ± 5% 1/2W
R420	ERC12GJ123	Solid 12KΩ ± 5% 1/2W
R421	ERD25TJ472	Carbon 4.7KΩ ± 5% 1/4W
R422	ERD25FJ271	Carbon 270Ω ± 5% 1/4W
R423	ERC12GJ186	Solid 18MΩ ± 5% 1/2W
R424	ERD25TJ473	Carbon 47KΩ ± 5% 1/4W
R430	TRPF6B3MR50A	Posistor
R501	ERD25TJ152	Carbon 1.5KΩ ± 5% 1/4W
R502	ERD25TJ223	Carbon 22KΩ ± 5% 1/4W
R503	ERQ12AJ220	Carbon 22Ω ± 5% 1/4W
R701	ERD25TJ392	Carbon 3.9KΩ ± 5% 1/4W
R702	ERD25TJ182	Carbon 1.8KΩ ± 5% 1/4W
R703	ERD25TJ561	Carbon 560Ω ± 5% 1/4W
R705	ERD25TJ682	Carbon 6.8KΩ ± 5% 1/4W
R706	ERD25TJ101	Carbon 100Ω ± 5% 1/4W
R707	ERC12GJ121	Solid 120Ω ± 5% 1/2W
R712	TRF10HMJ120	Non Flame 12Ω ± 5% 10W
R714	ERD25FJ680	Carbon 68Ω ± 5% 1/4W
R716	ERD25FJ5R6	Carbon 5.6Ω ± 5% 1/4W
CONTROLS		
VR19	EVTV0UA00B14	RF AGC 10KΩB
VR31	EVH0TAS20B25	Vert. Hold 200KΩB
VR32	EVTV0UA00B54	Vert. Height 50KΩB
VR33	EVTV0UA00B23	Vert. Lin 2KΩB
VR41	EVTV0UA00B52	Horiz. Hold 500ΩB
VR71	EVTV0UA00B13	AVR 1KΩB
OTHER PARTS		
X141	EFCS5R5MJ1	5.5MHz Cerap
	TJS869150	DC Socket
	XBA2C20SS0	Fuse
	TJC3316	Fuse Holder
	TJT8503MSE	3-P Socket Housing
	TJT8707M	Socket Housing Terminal